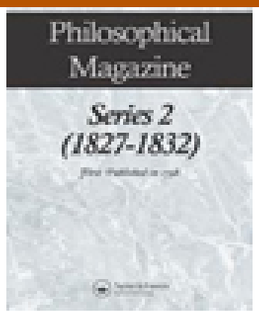


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# XXXVIII. On the crystalline form of the hyalosiderite

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or sub-families, be distinguished by the termination *ina* or *ana*, as *Papilionina*, *Coliana*, *Paphiana*, &c. This rule, so generally adopted in other departments of natural history by modern writers, will at once explain the station occupied by these groups, in relation to those throughout nature.

Tittenhanger Green, near St. Albans,
Feb. 1st, 1827.

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## XXXVIII. *On the Crystalline Form of the Hyalosiderite.* *By* William Phillips, *Esq. F.G.S. &c.**

DR. WALCHNER of Freiburg not long since described a new mineral, under the name of Hyalosiderite, in Schweigger's *Newes Journal;* and a translation of his communication has appeared in the 63rd vol. of the Philosophical Magazine, and also in the first vol. of the Edinburgh Journal of Science.

Having lately obtained a specimen of that extremely curious mineral, affording several nearly perfect crystals, well adapted for the use of the reflective goniometer, I was induced to measure them by means of it, both because the inspection of them raised some doubts of the correctness of Dr. Walchner's determination in attributing to this substance an octohedron as the primary form of its crystals, and also because he has himself observed, that his own determinations of the measurements he has given, "cannot boast of very great accuracy." But it is somewhat singular that Dr. Walchner should believe his determinations will nevertheless "contribute to adjust in some measure the determinations published in Hausmann's *Spec. Cryst. Metall.* relative to the crystals of iron slags formed in various metallurgical processes;" "for," says Dr. W., "we find a corresponding similarity not only in the forms in general, but also in the angles of inclination of the planes:" and he then observes, that the angles given by Hausman "could not but be very imperfect, on account of the small size" of the crystals.

Dr. Walchner has not said by what means he obtained the two measurements on which he has relied for the calculation of all the others given by him: he says, "the inclination of the planes *d* and *d'* ($a^1$ on *c* or *c'* of the following figure) may be determined most exactly, although on account of the smallness of these crystals, even these measurements remain imperfect;" and immediately adds, "the inclination on *d* on *d'* was determined to be 141°, and the inclination on *d'* on *a* (*c* or *c'*

* Communicated by the Author.

on

on P of the annexed figure) amounted to rather more than 130°."

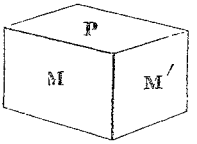
Now I have constantly found by means of the reflective goniometer, that the former of these angles is about 2 degrees less, the latter about 2 degrees greater, than Dr. Walchner's determination. I forbear, nevertheless, from annexing remarks, which naturally arise from a consideration of the preceding extracts from Dr. Walchner's communication; and should have been content with simply noticing the differences between his measurements and those afforded by the reflective goniometer, which alone is adapted for crystals so minute as those of the hyalosiderite (for no one of mine exceeds 1-20th of an inch in any direction), if I could have persuaded myself that some ill-founded prejudice against that admirable instrument, does not exist on the European continent generally, notwithstanding the many errors it has served to correct, the nice differences it has detected, and the ease with which it may be used. Rarely does a foreign mineralogist visit this country, who is acquainted with it except in theory: and I believe that in every foreign work on mineralogy, it is figured, not with the moveable pin at right angles, but horizontally, in continuation as it may be termed, with the axis, in which position it is almost useless. These observations are penned in the hope that they may meet the eye of Dr. Walchner, and serve to induce him to prove the superiority of the reflective goniometer, and consequently the futility of the prejudice against it, if in reality it exists.

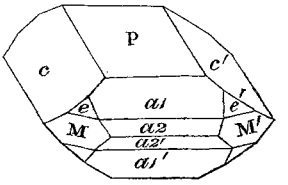
We know, however, that every measurement, by whatsoever means it may be made, is, from the natural imperfection of crystalline planes, rarely to be estimated but as an approximation; but it is also known from experience, that the reflective goniometer is most constant in its results, and the only one adapted for the measurement of small crystals, which commonly are by much the most accurate; for the results obtained by measuring them, agree much better with each other, than those obtained from large crystals.

There is at least one plane on the crystals of hyalosiderite which has not been observed by Dr. Walchner; and which, as it appears to me, is a very important one: it is the plane M of the following figure: most of the crystals in my possession show it, and on some of them it is comparatively large. Its presence has induced me to assume the primary form to be a right rhombic prism of about 105° and 75°. I say, about, because, owing perhaps to the brittleness of these crystals internally, I have not been able to detect with certainty a cleavage in any direction, and because we can only rely upon several

veral coinciding measurements taken upon planes produced by cleavage, which when properly made are usually found to agree,—whilst those taken upon the natural planes generally differ a few minutes. In one instance I found 104° 55′, not 105°. Hence the accuracy of measurements taken as the bases for calculation is very important.

Primary.




| | Measurements taken by the reflective goniometer. | Measurements of Dr. Walchner. |
|---|---|---|
| M on M′ . . . . | 105° 00′ | |
| P on M or M′ . | 90 00 | |
| —— *a* 1 . . . . | 132 32 | .....130° 18′ 56″ |
| —— *a* 2 . . . . | 114 35 | .....119 29 47 |
| —— *c* or *c*′ . . | 139 16 | .....141 4 54 |
| —— *e* or *e*′ . . | 110 14 | |
| M on *a* 1 . . . . | 124 10 | |
| —— *a* 2 . . . . | 135 5 | |
| —— *c* . . . . . | 113 35 | |
| —— *e* . . . . . | 159 40 | |
| *a* 1 on *a* 1′ . . . | 95 15 | .....99 22 8 |
| —— *a* 2 . . . | 162 22 | .....169 10 51 |
| —— *c* or *c*′ . . | 120 56 | |
| *a* 2 on *a* 2′ . . . | 130 10 | .....121 0 26 |
| —— *c* or *c*′ . . | 108 30 | |
| *c* on *c*′ . . . . . | 98 30 | |

The two measurements given by Haidinger in his translation of Mohs, vol. iii. p. 111, agree with those of Dr. Walchner.

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XL. *The Bakerian Lecture. On the Relations of Electrical and Chemical Changes. By Sir* Humphry Davy, *Bart. Pres. R.S.*

[Concluded from p. 104.]

VII. *On the accumulation of electricity, and the chemical changes it occasions in voltaic arrangements.*

IN the view of electro-motion adopted by the illustrious inventor of the pile, the metals were considered as the *only* agents